Abstract: P98

Cardiac ischemic tolerance of spontaneously hypertensive rats with increased expression of C-reactive protein.

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Topic(s):
Ischemia, Infarction, Cardioprotection

Citation:
Cardiovascular Research (2018) 114 (Supplement 1), S26

C-reactive protein (CRP) is a major acute-phase inflammatory reactant produced in the liver. It has been reported that increased CRP level is a risk factor for cardiovascular disease, including myocardial infarction, hypertension, and heart failure. However, it is not clear whether CRP is just a marker or an active mediator of any of these cardiovascular disorders. Therefore, the aim of this study was to analyze the effects of CRP overexpression on myocardial contractility and cardiac susceptibility to ischemia-reperfusion injury in adult spontaneously hypertensive rats expressing human CRP transgene in the liver (SHR-CRP) and age-matched SHR controls. Echocardiographic assessment of systolic function revealed significantly lower fractional shortening in SHR-CRP as compared to SHR (by 6-8 %) both at baseline and after the stimulation with increasing infusion rates of dobutamine. Using an open-chest model of coronary artery occlusion, we found significantly smaller infarct size normalized to the area at risk in SHR-CRP (48.5 ± 5.1 %) compared to SHR (66.5 ± 4.9 %). However, profound ischemic arrhythmogenesis resulting in significantly increased duration of ventricular tachyarrhythmias and the total number of premature ventricular complexes was observed in SHR-CRP (340 ± 56 s and 3299 ± 498, respectively) compared to SHR (103 ± 49 s and 1316 ± 511, respectively). In SHR-CRP, concentration of thromboxane B2, the inactive product of proarrhythmogenic thromboxane A2, increased by 185 % in ischemized compared to non-ischemized myocardium while it was not affected by ischemia in SHR controls. It can be concluded that transgenic CRP-SHR have opposite effects on two major end-points of cardiac ischemia-reperfusion injury (arrhythmias vs. infarction). The proarrhythmogenic effect of CRP overexpression can be related to increased thromboxane A2 level.